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1 38. A permanent magnet turbogenerator/motor restarting
2 system, comprising:
3 means for determining that the permanent magnet
4 turbogenerator/motor has a fatal fault present and is in the
5 process of shutting down;
6 means for determining that the permanent magnet
7 turbogenerator/motor has less than a fixed number of restart
8 attempts since the permanent magnet turbogenerator/motor was
9 determined to have a fatal fault;
10 determining that the permanent magnet
11 turbogenerator/motor is in a recharge state where an internal
12 energy storage device is being recharged as part of the
13 shutdown process;
14 means for determining that a fixed period of time has
15 elapsed since any previous attempt to restart the permanent
16 magnet turbogenerator/motor;
17 means to attempt to clear the fault present in the
18 permanent magnet turbogenerator/motor;

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19 means to issue a restart command to the permanent magnet
20 turbogenerator/motor if the fatal fault is successfully
21 cleared;

22 means to continue normal operation of the permanent
23 magnet turbogenerator/motor.

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1 ~~39~~. A permanent magnet turbogenerator/motor restarting
2 system, comprising:

3 means for determining that the permanent magnet
4 turbogenerator/motor has a fatal present and is in the
5 process of shutting down;;

6 means for determining that the permanent magnet
7 turbogenerator/motor has less than a fixed number of restart
8 attempts since the permanent magnet turbogenerator/motor was
9 determined to have a fatal fault;

10 means for determining that the permanent magnet
11 turbogenerator/motor is in a cooldown state where the
12 turbogenerator/motor is being rotated when combustion has
13 ceased to lower the internal temperature as part of the
14 shutdown process and that the internal temperature is below a
15 cooldown restart temperature;

16 means for determining that a fixed period of time has
17 elapsed since any previous attempt to restart the permanent
18 magnet turbogenerator/motor;

19 means to attempt to clear the fault present in the
20 permanent magnet turbogenerator/motor;

21 means to issue a restart command to the permanent magnet
22 turbogenerator/motor if the fatal fault is successfully
23 cleared; and

24 means to continue normal operation of the permanent
25 magnet turbogenerator/motor.

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1 ~~48~~. A permanent magnet turbogenerator/motor restarting
2 system, comprising:
3 means for determining that the permanent magnet
4 turbogenerator/motor has a fatal fault present and is in the
5 process of shutting down;
6 means for determining that the permanent magnet
7 turbogenerator/motor has less than a fixed number of restart
8 attempts since the permanent magnet turbogenerator/motor was
9 determined to have a fatal fault;
10 means for determining that the permanent magnet
11 turbogenerator/motor is in a fault state;
12 means for determining that a fixed period of time has
13 elapsed since any previous attempt to restart the permanent
14 magnet turbogenerator/motor;
15 means to attempt to clear the fault present in the
16 permanent magnet turbogenerator/motor;
17 means to issue a restart command to the permanent magnet
18 turbogenerator/motor if the fatal fault is successfully
19 cleared; and
20 means to continue normal operation of the permanent
21 magnet turbogenerator/motor.

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1 ~~49~~. A permanent magnet turbogenerator/motor restarting
2 system, comprising:
3 means for determining that the permanent magnet
4 turbogenerator/motor has a fatal fault present and is in the
5 process of shutting down;
6 means for determining that the permanent magnet:
7 turbogenerator/motor has less than a fixed number of restart
8 attempts since the permanent magnet turbogenerator/motor was
9 determined to have a fatal fault;

10 means for determining that the permanent magnet
11 turbogenerator/motor is in a standby state;
12 means to issue a restart command to the permanent magnet
13 turbogenerator/motor; and
14 means to continue normal operation of the permanent
15 magnet turbogenerator/motor.

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1 42. A permanent magnet turbogenerator/motor restarting
2 system, comprising:

3 means for determining that the permanent magnet
4 turbogenerator/motor has a fatal fault present and is in the
5 process of shutting down;

6 means for determining that the permanent magnet
7 turbogenerator/motor has less than a fixed number of restart
8 attempts since the permanent magnet turbogenerator/motor was
9 determined to have a fatal fault;

10 means for determining that the permanent magnet
11 turbogenerator/motor is in a recharge state where an internal
12 energy storage device is being recharged as part of the
13 shutdown process;

14 means for determining that a fixed period of time has
15 not elapsed since any previous attempt to restart the
16 permanent magnet turbogenerator/motor;

17 means to continue shutdown of the permanent magnet
18 turbogenerator/motor.

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1 43. A permanent magnet turbogenerator/motor restarting
2 system, comprising:

3 means for determining that the permanent magnet
4 turbogenerator/motor has a fatal fault present and is in the
5 process of shutting down;

6 means for determining that the permanent magnet
7 turbogenerator/motor has less than a fixed number of restart
8 attempts since the permanent magnet turbogenerator/motor was
9 determined to have a fatal fault;

10 means for determining that the permanent magnet
11 turbogenerator/motor is in a cooldown state where the
12 turbogenerator/motor is being rotated when combustion has
13 ceased to lower the internal temperature as part of the
14 shutdown process and that the internal temperature is below a
15 cooldown restart temperature;

16 means for determining that a fixed period of time has
17 elapsed since any previous attempt to restart the permanent
18 magnet turbogenerator/motor;

19 means to attempt to clear the fault present in the
20 permanent magnet turbogenerator/motor;

21 and

22 means to continue shutdown of the permanent magnet
23 turbogenerator/motor when the fault is not cleared.

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1 44. A permanent magnet turbogenerator/motor restarting
2 system, comprising:

3 means for determining that the permanent magnet
4 turbogenerator/motor has a fatal fault present and is in the
5 process of shutting down.

6 means for determining that the permanent magnet
7 turbogenerator/motor has less than a fixed number of restart
8 attempts since the permanent magnet turbogenerator/motor was
9 determined to have a fatal fault;

10 means for determining that the permanent magnet
11 turbogenerator/motor is in a fault state;

12 means for determining that a fixed period of time has
13 elapsed since any previous attempt to restart the permanent
14 magnet turbogenerator/motor;
15 means to attempt to clear the fault present in the
16 permanent magnet turbogenerator/motor; and
17 means to continue shutdown of the permanent magnet
18 turbogenerator/motor when the fault is not cleared.

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1 45. The permanent magnet turbogenerator/motor
2 restarting system of claim 44 wherein said means for
3 determining that the permanent magnet turbogenerator/motor
4 has a fatal fault present and is in the process of shutting
5 down, comprises:

6 means for detecting no output over-current;

7 means for detecting a loss of output current control or
8 a loss of DC bus voltage control;

9 means for determining that less than a fixed number of
10 warning faults has occurred within a fixed period of time;

11 means for reporting a grid unbalance warning fault;

12 means for disabling the output power converter of the
13 permanent magnet turbogenerator/motor;

14 means for analyzing the grid voltage magnitude and
15 frequency for an unacceptable connection;

16 means for determining that the maximum allowable
17 reconnection time has not expired;

18 means for determining that the DC bus level is not below
19 the turn on point of the brake resistor,

20 means for applying the brake resistor to control DC bus
21 voltage;

22 means for determining that the grid is acceptable for
23 connection; and

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